NASA Earth Observations Informing Energy Management Decision Making

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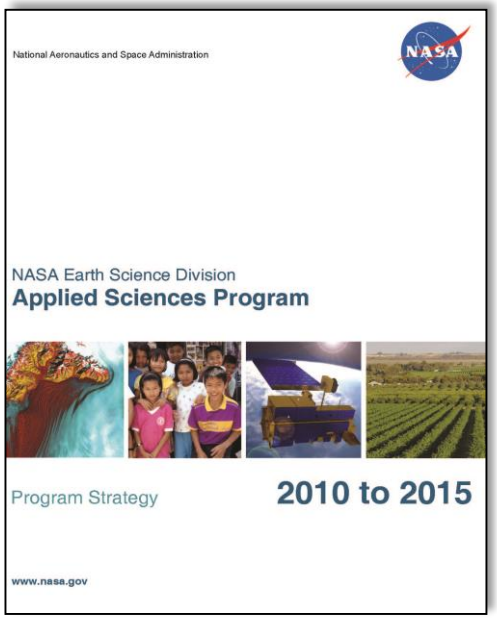
NASA Applied Sciences Program: Lines of Business

Discovering and demonstrating innovative and practical uses of Earth observations in organizations' policy, business, and management decisions.



http://AppliedSciences.NASA.gov

Applications
Prove-out, develop, and transition applications ideas for sustained uses of Earth obs. in decision making.

Capacity Building
Build skills and capabilities in US and developing countries to access Earth observations to benefit society.

Mission Planning
Identify applications early in mission lifecycle and integrate end-user needs in mission design and development.

NASA Applied Sciences Program: Applications Areas

Emphasis in 4 Applications Areas

Health & Air Quality

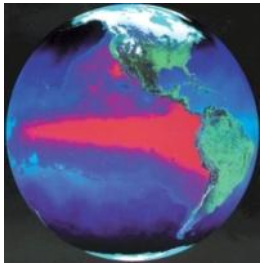
Water Resources

Disasters

Ecological Forecasting

Support opportunities in 5 additional areas

Agriculture



Climate

Weather

Energy

Oceans

NASA Earth Science Missions

Current NASA Missions Providing Data Related to Energy Sector Needs

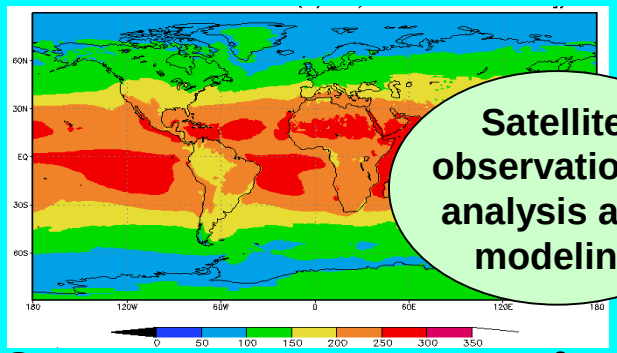
Parameter Type	Satellite Missions/Instruments (Parameter)
Solar Resources	Solar Radiation and Climate Experiment (SORCE) STPSat-3 Total Solar Irradiance Calibration Transfer Experiment (TCTE) (non-NASA) (extraterrestrial solar irradiance)
	Aqua/Terra/NPP Cloud and Earth Radiant Energy System (CERES) (surface solar fluxes including direct and diffuse)
	DISCOVR NISTAR (surface solar flux) (products not available yet)
Meteorological Parameters	CALIPSO, CloudSat, GPM/GMI and DPR, Terra/Aqua/MODIS, Terra MISR, Aqua AIRS, Aura OMI, Suomi NPP VIIRS, DISCOVR/NISTAR and EPIC (cloud water and other cloud information)
	GPM/GMI and DPR, CloudSat (precipitation)
	Aqua AIRS/AMSU/HSB, Aura HIRDLS (atmospheric temperature)
Atmospheric Composition	Terra/Aqua/MODIS, Aqua AIRS, Aura MLS, Suomi NPP CRIS, GPM GMI, Joasn-2 (water vapor)
	CALIPSO, Terra/Aqua/MODIS, Terra MISR, Suomi NPP VIIRS, Aura OMI, DSCOVR/EPIC (aerosols)
	Aura OMI, Aura MLS, Aura TES, Aura HIRDLS, Aqua AIRS, OCO-2, DSCOVR/EPIC (ozone, gases)
Land Parameters	Shuttle Radar Topography Mission (SRTM, flown in 2000) (elevation/topography)
	Terra/Aqua/MODIS, Terra MISR, Terra ASTER, Suomi NPP VIIRS, Aura OMI DISCOVR/EPIC, Landsat (surface reflectance, albedo)

POWER Overview

- **Objectives:** Improve the Nation's public/private capability for integrating environmental data from NASA research to support increased renewable energy development, energy efficiency and agricultural modeling.
- **Goals:** Through partnerships, derive/validate/provide parameters relevant to industry needs, link to decision support, and transition capabilities when possible.
- **Website:** **http://power.larc.nasa.gov**

POWER Approach: Research to Decisions

NASA Earth-Sun Satellite Analysis and Modeling Projects: (ISCCP, GEWEX SRB, CERES FLASHFlux, GMAO GEOS)



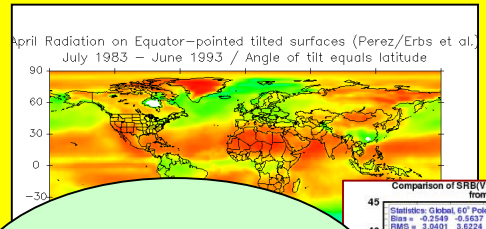
Surface Solar Irradiance (W m^{-2})

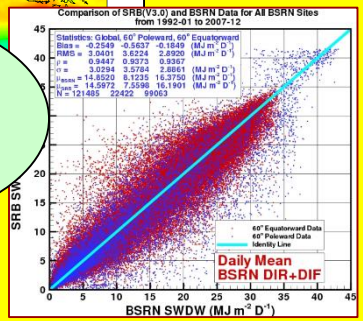
Satellite observations, analysis and modeling

Adaptation and validation of parameters

POWER/SSE Project

Solar and meteorological parameters in specialized units



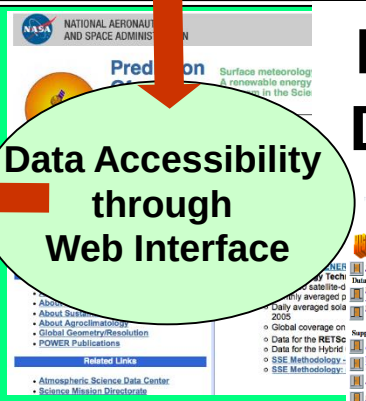


RETScreen®

Decision Support System design and planning tool

Data Accessibility through Web Interface

POWER/SSE Datasets and



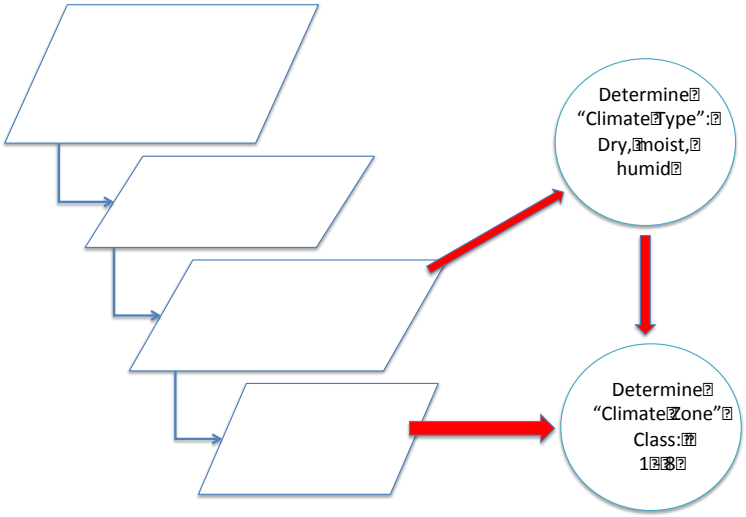
200+ Parameters (most on-the-fly)

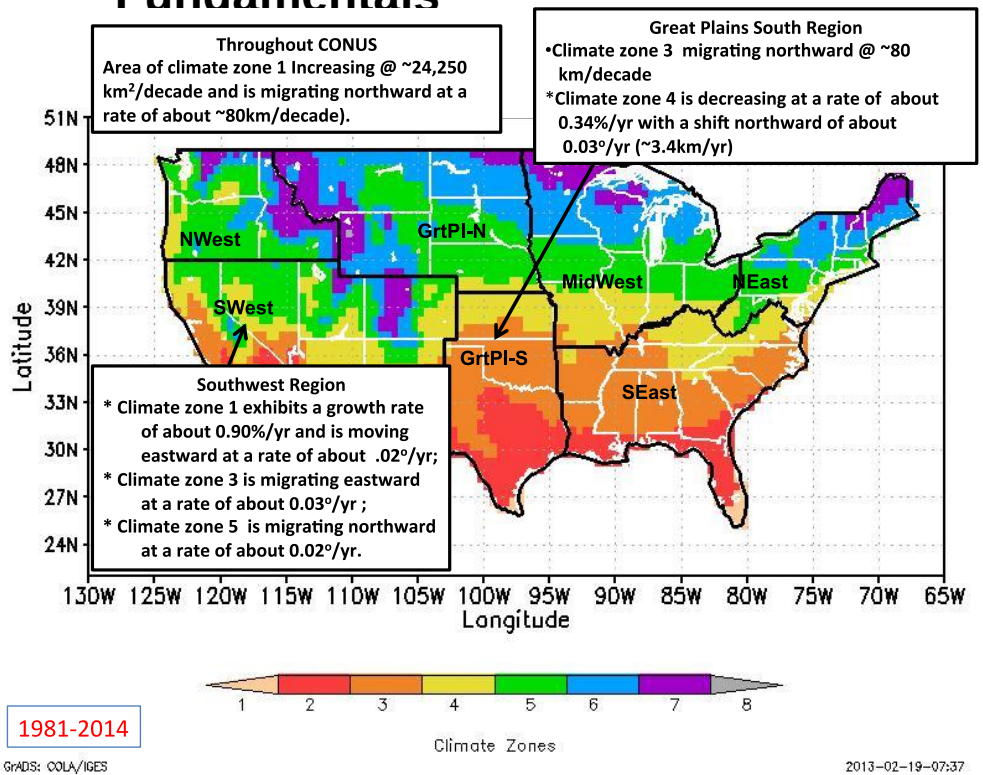
(~15,000 unique users, ~ 1,200,000 hits and 230,000 data downloads per month)

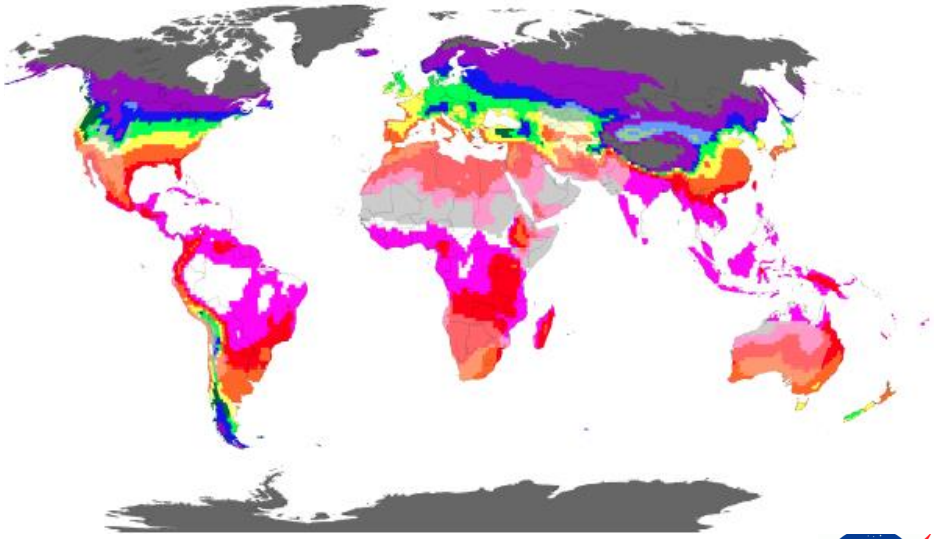
~ 450,000 Global Users

POWER and ASHRAE Collaboration: Assessing Building Climate Zone Changes

- **Collaborated with ASHRAE to provide/assess Building Climate Zones from NASA reanalysis (GEOS-4 and MERRA)**
- **Provided to ASHRAE and it was included ASHRAE Handbook of Fundamentals**







Energy Initiatives

GEO GROUP ON EARTH OBSERVATIONS

IRENA International Renewable Energy Agency

iea International Energy Agency Secure Sustainable Together

CEOS

ESIP The Federation of Earth Science Information Partners
Fostering connections to make data matter

SUSTAINABLE DEVELOPMENT GOALS

Summary and Conclusions

- NASA has considerable investments in satellite measurements and analysis of those products for various earth science data products
- NASA also has an extensive modeling and assimilation capability comprising both long-term analysis, short-term, and climate forecasts
- Many of those data products have been useful in an Energy context
- What are the evolving needs of energy sector? What types and sorts of data are needed? What role can NASA play?